

Supporting Information

Ultra-sensitive, Rapid Gold Nano Particle-Quantum Dot (PQ) Plexcitonic Self-Assembled Aptamer-based Nanobiosensor for the Detection of Human Cardiac Troponin I.

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The Calculation of the limit of detection (LOD):

$LOD = 3 \times \text{Standard deviation of blank/Slope}$ (based on International Union of Pure and Applied Chemistry, IUPAC). [1]

According to Fig. 4 D

$$a=30.06x+146.8$$

Standard deviation of blank is 3.166

$$\text{So } (3.166 \times 3) / 30.06 = 0.3159 \text{ fM}$$

The molecular weight of Cardiac Troponin I is 24 KD so the LOD is 0.3159 fM or 7.58 pg/L.

Reference

[1] Ramezani, M., Mohammad, Danesh, N., Lavaee, P., Abnous, K. and Mohammad Taghdisi, S., *Biosens. Bioelectron.* 2015, 70, 181-187.

Supporting Information Figures

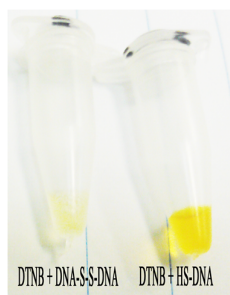


Figure S1. DTNB Test

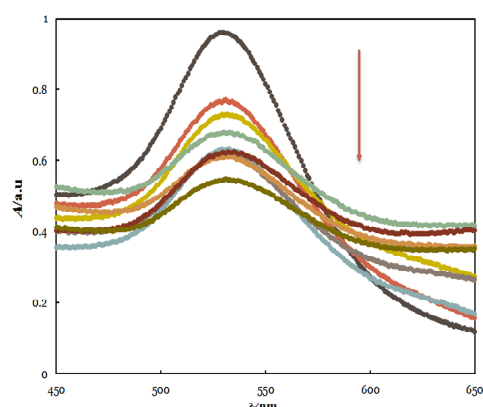


Figure S2. GNPs LSPR in the presence of increasing concentrations of linker DNA (0-80 nM). The results demonstrate that following bioconjugation, the LSPR is decreased.

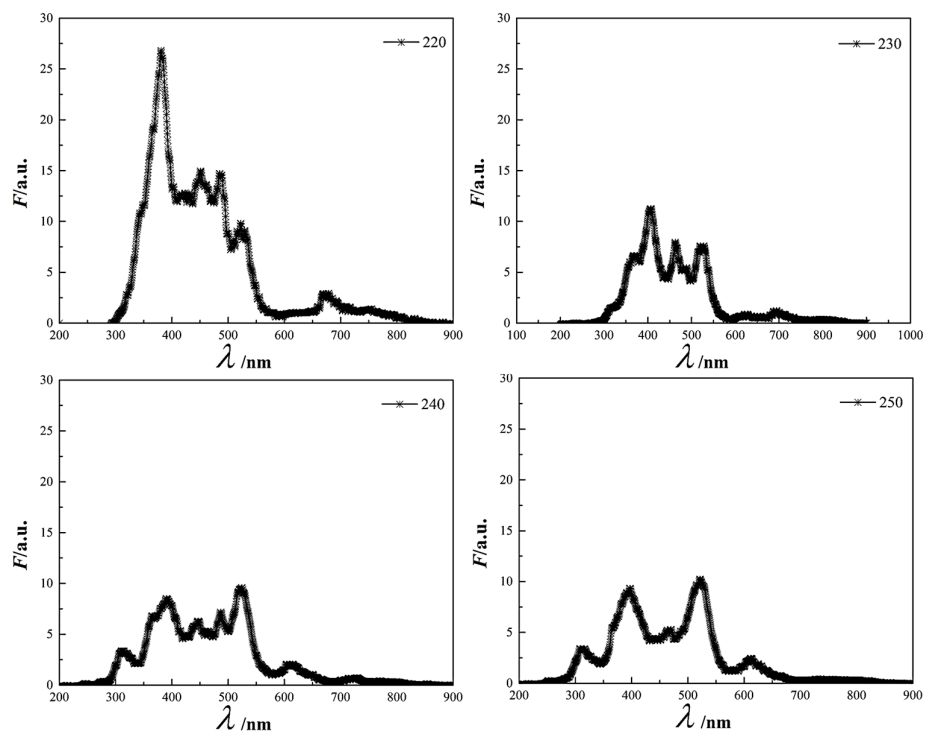


Figure S3. Fluorescence study of the bioconjugated quantum dots at $\lambda_{exc}220-250$.

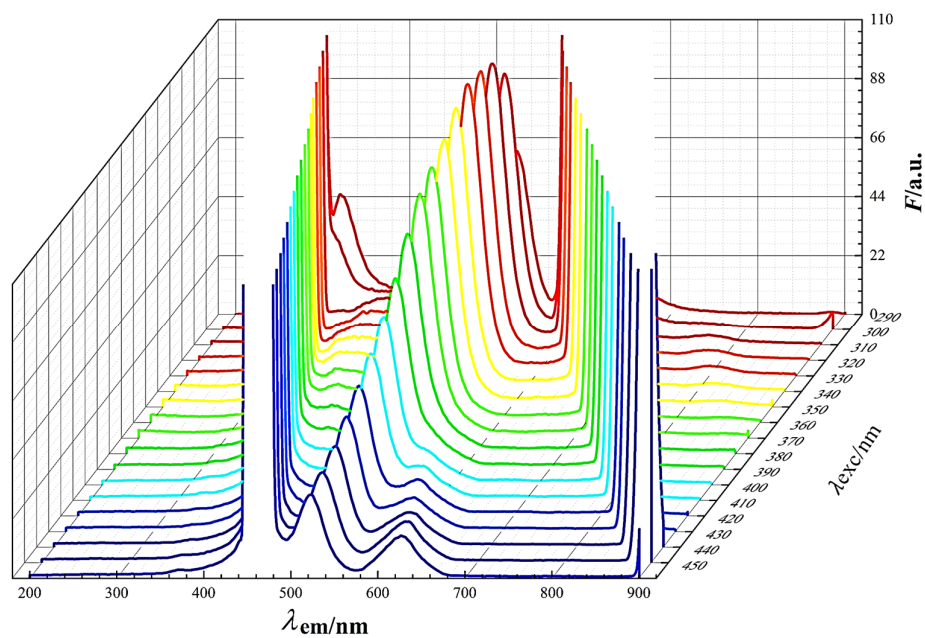


Figure S4. Fluorescence study of the bioconjugated quantum dots at $\lambda_{exc}300-460$.

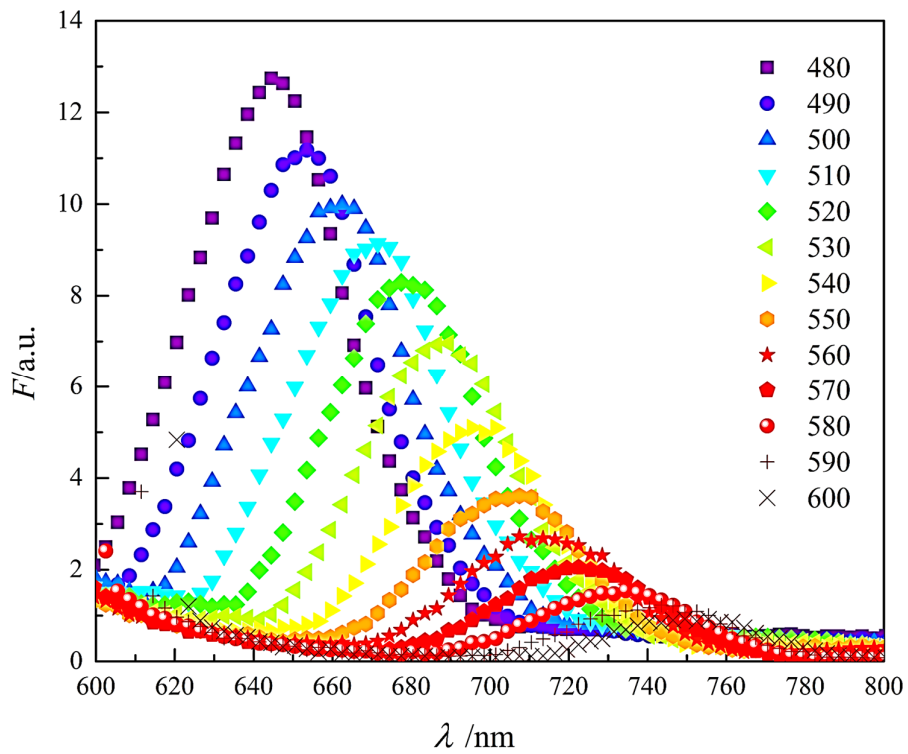


Figure S5. Fluorescence study of the bioconjugated quantum dots at $\lambda_{exc}480-600$.

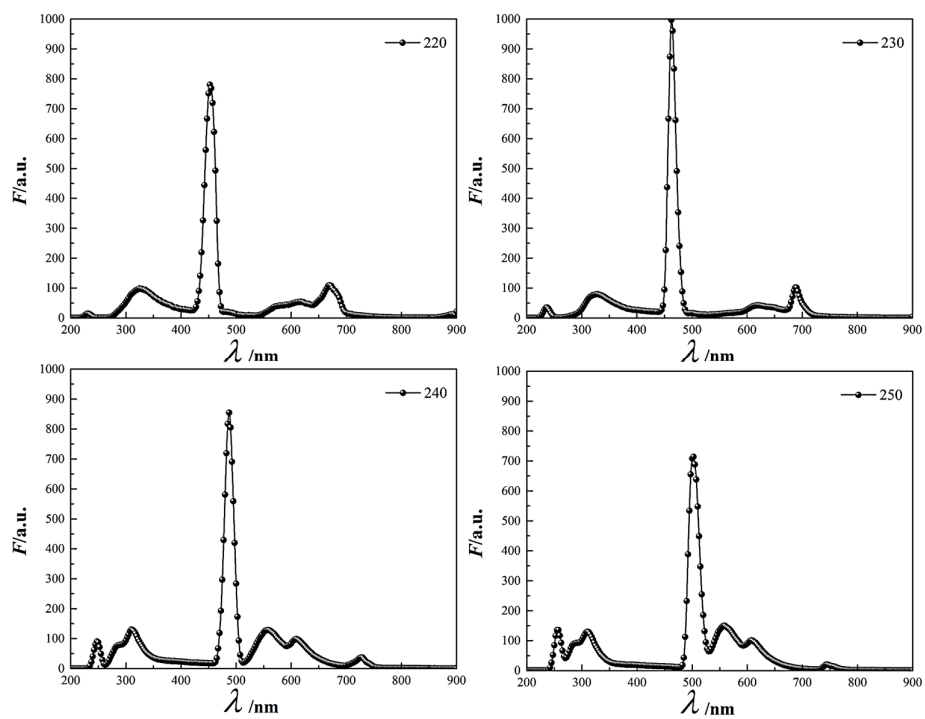


Figure S6. Fluorescence study of the PQ plexitonic hybrid system at $\lambda_{exc}220-250$.

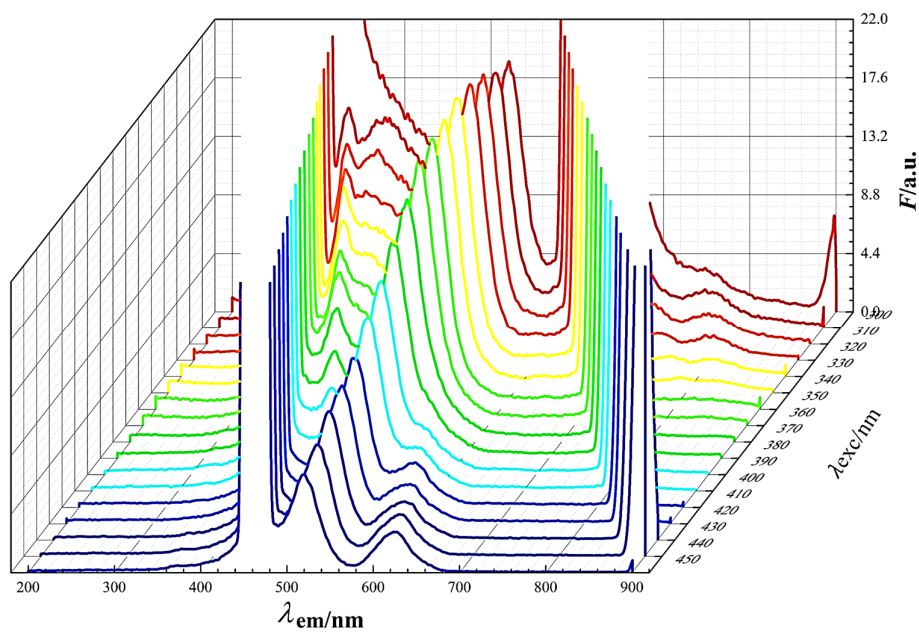


Figure S7. Fluorescence study of the PQ plexitonic hybrid system at $\lambda_{exc}300-460$.

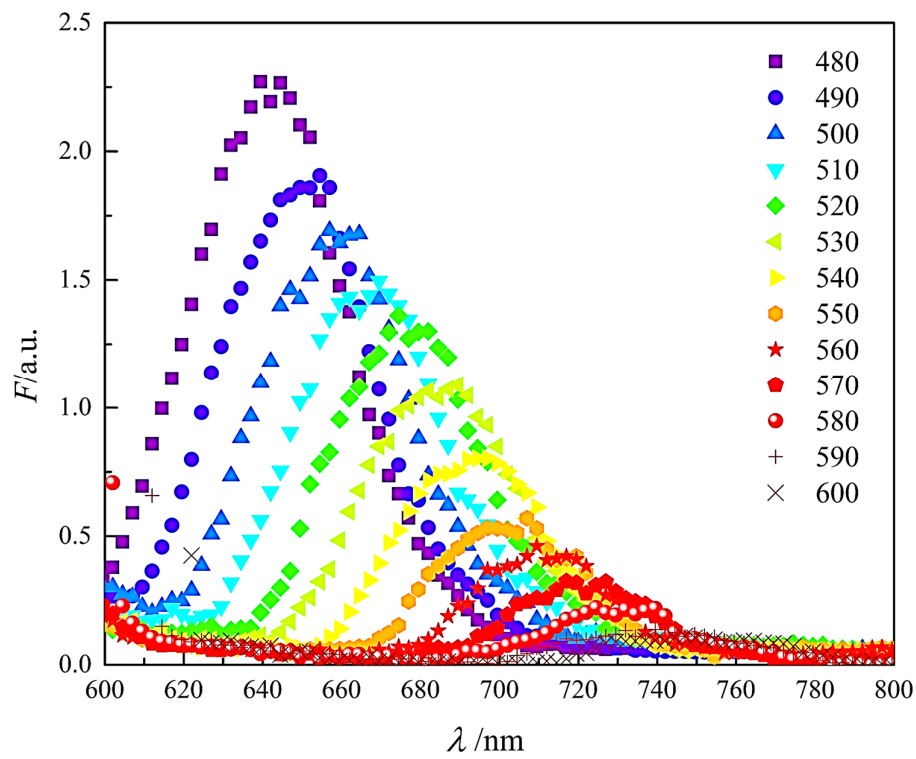


Figure S8. Fluorescence study of the PQ plexcitonic hybrid system at $\lambda_{exc}480-600$.

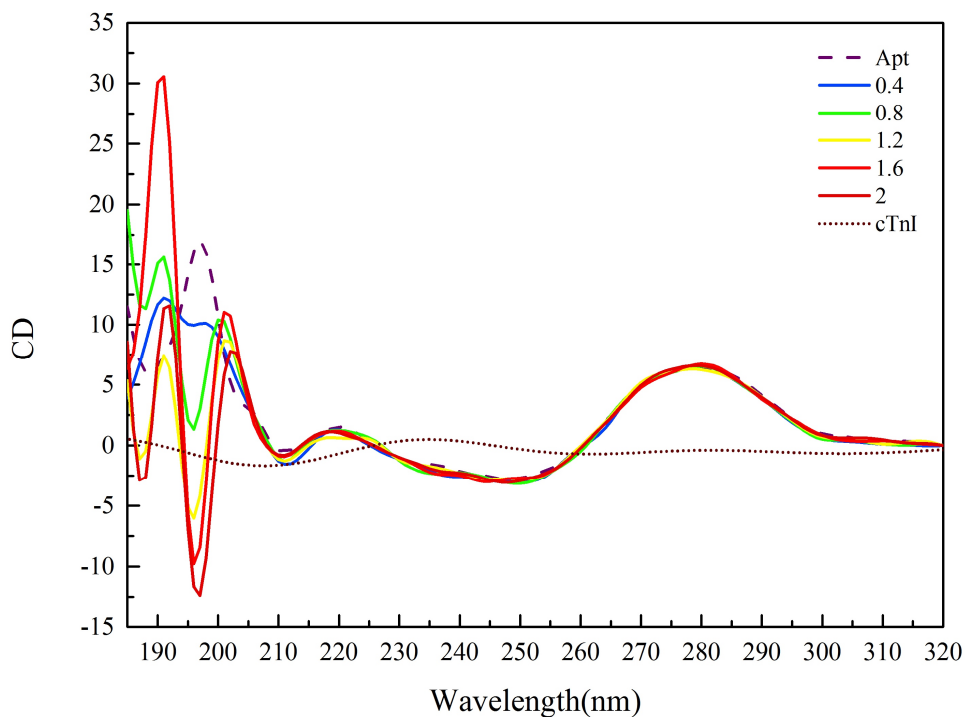


Figure S9. Circular Dichroism study of aptamer (5 μM) in the presence of different concentrations of cTnI (fM)

It should be mentioned that circular dichroism (CD) study of the aptamer in the presence of different concentrations of cTnI illustrates no conformational change in the aptamer (Fig. S9). It seems that in regard to cTnI structure, two α -helix act as a clamp which leads to shorten the distance between two linker oligonucleotides, thus yields to reduction of the distance between GNPs and QDs.

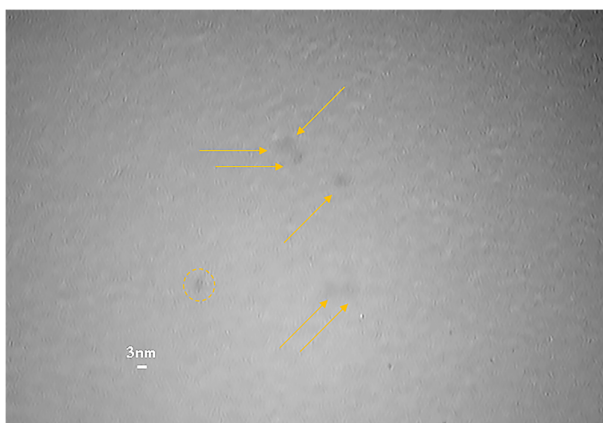


Figure S10. TEM images of pure QDs